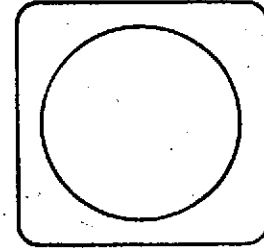


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EARTH SATELLITE CORPORATION
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March 19, 1974

National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

ATTENTION: Distribution

RE: Type I Progress Report
New Jersey Coastal Mapping
NAS5-21765

Gentlemen:

The New Jersey Department of Environmental Protection and Earth Satellite Corporation are pleased to submit a Type I Progress Report for the two-month period ending February 28, 1974.

- A. TITLE: Application of ERTS-1 Data to the Protection and Management of New Jersey's Coastal Environment (SR #304)
- B. PRINCIPAL INVESTIGATOR: Mr. Roland S. Yunghans, New Jersey Department of Environmental Protection
- C. CO-PRINCIPAL INVESTIGATORS: Dr. Edward B. Feinberg, New Jersey Department of Environmental Protection
Dr. Frank J. Wobber, Earth Satellite Corporation
- D. CO-INVESTIGATOR: Mr. Robert L. Mairs, Earth Satellite Corporation
- E. PRINCIPAL CONTRIBUTORS: Mr. Robert T. Macomber, Earth Satellite Corporation
Mr. Dennis Stanczuk, Earth Satellite Corporation
Ms. JoAnn Stitt, New Jersey Department of Environmental Protection

E74-10391) APPLICATION OF ERTS-1 DATA
TO THE PROTECTION AND MANAGEMENT OF NEW
JERSEY'S COASTAL ENVIRONMENT Progress
Report, period ending 28 Feb. (Earth
Satellite Corp.) 5 p HC \$4.00 CSCL 08A

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F. OBJECTIVES OF INVESTIGATION:

- to develop useful information products from ERTS-1 analysis of imaged coastal land and marine resources and to apply these products to the regulation, protection, and management of New Jersey's coastal zone.
- to develop a user capability within the New Jersey Department of Environmental Protection to utilize remote sensing data.
- to estimate benefits from ERTS to the New Jersey Department of Environmental Protection.

G. SUMMARY OF ACCOMPLISHMENTS:

The primary accomplishments during this two-month period of the experiment are summarized on the following pages by phase. Accomplishments are detailed by task in the TASK STATUS REPORT (Appendix A).

PHASE I: PRE-LAUNCH PREPARATION

- All pre-launch preparation tasks have been completed except for the letter contacts with other coastal states. A brochure is in the final stages of preparation detailing specific accomplishments realized in New Jersey.

PHASE II: FIRST-LOOK ANALYSIS

- All first-look analysis tasks have been completed. Many of these tasks are implicitly carried over into Phase III analysis, even though they are not so stated.

PHASE III: CONTINUING DATA ANALYSIS

- All ERTS-1 data, collateral aircraft data, and ground truth data are being routinely analyzed for the development of operational techniques and the preparation of information products.
- Problem areas receiving analysis during this reporting period have been centered on offshore waste disposal, coastal zone surveillance (developmental change detection), shore erosion/accretion studies, and the feasibility of an automated data analysis technique for coastal zone surveillance and a rapid access experiment to demonstrate timeliness as a capability in satellite monitoring systems.
- A working interface between NJDEP and EarthSat personnel is continuing and has proved fruitful by identifying the need for both continued and new research in many relevant application areas. A proposal to perform these additional efforts has been written with the input, aid and approval of NJDEP. Approval of the need and usefulness of this proposed research was signified by NJDEP by their budgeting \$50,000 for these efforts.

- Preparation of the final report of the shoreline erosion case study is nearing completion. Graphic and tabular data summaries have been prepared to facilitate the interpretation of the erosion and accretion values. The most significant of these summaries is the graph of the ratio of beach width to the rate of high water line positional change. At each station within both test areas, the ratio rate of erosion of the HWL relative to beach width was determined for six time intervals and averaged to obtain the mean ratio of beach width eroded at each station for the entire 17-year study period. This mean ratio is actually a mean percent of beach width eroded. The same calculation was performed for rates of accretion of the high water line.
- A paper entitled, "Applications of ERTS-1 Data to the Protection and Management of New Jersey's Coastal Environment," is being prepared for presentation at the Ninth International Symposium on Remote Sensing of Environment in Ann Arbor, Michigan as part of a plenary session on state application of ERTS data during the week of April 15, 1974.

H. SIGNIFICANT RESULTS:

- Rapid access to ERTS data was provided by NASA GSFC for the February 26, 1974 overpass of the New Jersey test site. Forty-seven (47) hours following the overpass computer-compatible tapes were ready for processing at EarthSat. Processing and the production of four Litton prints covering the coast of New Jersey was completed overnight by EarthSat to meet NJDEP's operational needs. Data processing included programs to reformat, window, square, grey scale adjust and output a Litton compatible tape. The finished product was ready at 8:00 AM Friday, March 1, 1974, only 60 hours following the overpass, and was subsequently delivered to NJDEP in Trenton, New Jersey. This operational demonstration has been successful in convincing NJDEP as to the worth of ERTS as an operational monitoring and enforcement tool of significant value to the State.
- The reduction and analysis of the ground truth data collected via low altitude reconnaissance along the New Jersey coast in November of 1973 is nearing completion. The data as reported earlier consists of low altitude aerial oblique 35mm slides of each of the 276 sites interpreted from ERTS to have undergone some form of landscape alteration between ERTS overpasses of October 10, 1972 and July 6, 1973. A commentary of the observer's observations has been transcribed from the tape recording made during the ground truth flights.

A reporting sheet is being prepared listing all 276 sites and providing summary information as to the following:

- 1) location of change - type of surrounding area
- 2) type of change
- 3) ERTS-detected change confirmed
- 4) ERTS-detected change unconfirmed
- 5) change observed in field which was not detected on ERTS
 - 5a) change imaged on ERTS subsequent to field truth date
 - 5b) change not imaged on ERTS subsequent to field truth date

A summary of the accuracy of change detection interpretation using successive ERTS images will include:

- 1) % errors of commission
 - 2) % errors of omission
 - 3) overall % confidence in interpreting developmental, agricultural, ecological, tidal, erosional/accretional, and seasonal types of landscape alterations from ERTS
- An Erosion/Accretion Severity Index has been developed for the New Jersey shore case study area. Absolute values of erosion and accretion rates are useful data; however, when attempting to determine the severity of erosion at a point of the beach, they may be misleading. A wide beach can tolerate a higher rate of erosion than a narrow beach (e.g., erosion of 10 feet on a 100-foot beach is not as critical as 10 feet of erosion on a 20-foot beach).
 - Computerized analysis techniques have been used for monitoring off-shore waste disposal dumping locations, drift vectors, and dispersion rates in the New York Bight area. A computer shade print of the area, including the dump zone, was used to identify intensity levels from high to low concentrations of acid waste. Two classes of acid waste were decided upon via photo interpretive methods.

They are:

intensity level

- | | |
|------------------------|-------|
| 1) Fresh acid dump | 29-33 |
| 2) Dispersed acid dump | 23-28 |

A Litton Intensity Slice print of each class was made to provide graphic presentation of dispersion characteristics and the dump extent. Continued computer assisted monitoring will lead to the recommendation and justification of permanent dumping sites which pose no threat to water quality in the nearshore environment.

I. PROBLEMS:

None

J. RECOMMENDATIONS FOR TECHNICAL CHANGES:

None

K. CHANGES TO STANDING ORDER FORMS:

No change is requested.

Sincerely-yours,

File Copy Signed By
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New Jersey Department of
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